

Lowell Regional Wastewater 451 First Street Boulevard Lowell, MA 01854 Attn: Aaron Fox

January 29, 2020

Dear Mr. Fox,

Enclosed please find the toxicological evaluation and chemical analyses report for the effluent sample received on January 13, 2020. This is your first quarter 2020 bioassay. Please call me at (401) 353-3420 if you have any questions.

Sincerely,

Michael McCallum Technical Laboratory Director

NEW ENGLAND TESTING LABORATORY, INC.

59 Greenhill St., West Warwick, RI 02893 (401) 353-3420 TOXICOLOGICAL EVALUATION AND CHEMICAL ANALYSES OF EFFLUENT: NPDES Permit # MA0100633 First Quarter 2020 Samples Lowell Regional Wastewater

> Prepared For: Lowell Regional Wastewater 451 First Street Boulevard Lowell, MA 01854

> > January 29, 2020

By New England Testing Laboratory, Inc. 59 Greenhill Street West Warwick, RI 02893

NETLAB CASE NUMBER: 0A13003



GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION
MANAGEMENT

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# NEW ENGLAND BIOASSAY A DIVISION OF GZA CHRONIC AQUATIC TOXICITY TEST REPORT

Permitee:	Low	vell RWWU			NPDES #	MAC	0100633				
Report submitted to:	New England	Testing Labo	oratori	es	•       •						
	59 Greenhill St	reet, West V	Varwic	k RI	<b>-</b> n <b>-</b> a						
Sample ID:		Effluent									
Test Month/Year:	Jan	January 2020									
NEB Proj#	05.0	0044476.00			-0.1						
Test Type / Method:					tatic-Ren	ewal	Freshwater				
	Test Method 100	2.U; EPA 021	. <del>-</del> K-UZ-	012							
Effluent Sample Dates:	#11/12-13/2	20#2	1/14	1-15/2	.0#3	1	/16-17/20				
Test Start Date:											
Results Summary											
Your results were as follows:											
Passed all permit limits											
	Acı	ute Test Resi	ults								
Species	LC50	A-NOE	С	Pern	nit Limit		Pass / Fail				
Ceriodaphnia dubia	>100%	100%		≥	100%		Pass				
	Chro	onic Test Res	sults								
Species	C-NOEC	C-LOEC	IC:	25	Permit L	imit	Pass/Fail				
Ceriodaphnia dubia	100%	>100%	>10	0%	N/A		N/A				
Data Qualifiers affecting	this test:										

Certifications & Approvals: NH ELAP (2071), NJ DEP (CT405)

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#### **Test Report Certification**

Permittee name:	Lowell RWWU	Permit number:	MA0100633					
Client sample ID:	Effluent	Test Start Date:	1/14/20					
Whole	Effluent Toxicity Test	Report Certification (Permit	tee)					
supervision in accord evaluate the informatio those persons directly knowledge and beli submitting false info	dance with a system designed n submitted. Based on my inq responsible for gathering info ef, true, accurate, and comple	nd all attachments were prepared un to assure that qualified personnel pr juiry of the person or persons who m ormation, the information submitted ete. I am aware that there are signification	roperly gather and nanage the system, or is, to the best of my cant penalties for					
Executed on:	(Date)	Authorized Signature						
		Print or Type Name and Title						
		Print or Type the Permittee's Name						
		MA0100633	3					
		Print or Type the NPDES Permit I	Number					
Whole Efflu	ent Toxicity Test Repo	rt Certification (Bioassay Lal	oratory)					
The	results reported relate only t	to the samples submitted as received	1					
supervision in accord evaluate the information those persons directly knowledge and belie	ance with a system designed n submitted. Based on my inq responsible for gathering info ef, true, accurate, and comple	ad all attachments were prepared un- to assure that qualified personnel pr uiry of the person or persons who m rmation, the information submitted etc. I am aware that there are signification	operly gather and lanage the system, or is, to the best of my cant penalties for					
Executed on:	20 20 (Date)	Kimberly Wil Laboratory Man New England Bioassay a d	ager					

#### **General Test Conditions**

Permittee name	Lowell RWWU	Perm	nit number:	MA0100633
Client sample ID	Effluent	Test	Start Date:	1/14/20
	Sample Collecti	on Information		
Effluent #1 Dates/Times: 1/12- Effluent #2 Dates/Times: 1/14- Effluent #3 Dates/Times: 1/16- Were a minimum of three sample Were samples used within the fire sample collection note:	15/20 @ 0700-0700 17/20 @ 0700-0700 es collected? Yes	Receiving Water #2 Receiving Water #3 No *(see note	Pate/Time: _ B Date/Time: _	1/15/20 @ 0800 1/17/20 @ 0800
	Test Cor	nditions		
Permittee's Receiving Water: Note that the Permittee's Receiving Water: Note that the Permittee Note the Permittee Note the Pe	nthetic soft water (hard collected at a point imr 0%, 6.25%, 12.5%, 25%, No  Yes  wi rine is measured using 4 ed	nediately upstream of 50%, 100% th Instant Ocean sea 500 CL-G DPD Colori	of or away fro	ppt
	Reference To	oxicant Data		
	Ceriodaph	nia dubia		
	Date:	1/2/20		
	Toxicant:	Sodium chloride		
	Dilution Water:	NEB CTRMH		
	Organism Source: _	NEB .		
	Reproduction IC25:_	1.11 g/L		
	Results within range	Yes 🗹 No 🗀		

#### Ceriodaphnia dubia Test Results

Permittee name:	Lo	owell RWWU	Permit number: MA0100633						
Client sample ID:	Efflu	uent	Test Dates: _	1/14/20	- 1/20/20				
		Test Acceptability C	Criteria						
Lab Diluent Survival:	100%	Mean Lab Diluent Rep	roduction:	30.5you	ing per female				
River Control Survival:	100%	Mean River Control Re	production: 33.5 young per female						
Thiosulfate Control Survival:	N/A%	Mean Thiosulfate Cont	rol Reproduction	n: <u>N/A</u> you	ing per female				
Presence of an asterisk (*) ind the bottom of the following pa		iteria was not met, see	explanation in th	ne "Results Disc	ussion" section at				
		Test Results							
		Permit Limit	Test Result P	ass/Fail Status					

		Permit Limit	Test Result	Pass/Fail Status
Acuto	48 hr LC50	≥ 100%	>100%	Pass
Acute Data	48 hr NOEC		100%	
	TUa			
	Chronic LC50		>100%	
	Survival C-NOEC		100%	
	Survival C-LOEC		>100%	
	Reproduction C-NOEC		100%	
Chronic	Reproduction C-LOEC		>100%	
Data	Reproduction IC25		>100%	
Julia	Reproduction IC50		>100%	BILLY IN
	Reportable C-NOEC		100%	
	Reportable C-LOEC		>100%	
	MATC		>100%	
	TUc			

Presence of an asterisk (\*) indicates qualified data, see explanation in the "Results Discussion" section at the bottom of the following page.

Test Variability	Test Variability									
Reproduction PMSD: 23.7% Upper & Lower EPA bounds: 13 - 47% Low Within bounds High										
$\square$ PMSD exceeds upper bounds. Test results are highly variable and may not be sensitive enough to determine										
the presence of toxicity at the permit limit concentration (PLC)										
The PMSD falls within the upper (47%) and lower (13%) bounds. Results are reportable.										
$\square$ PMSD falls below the lower bound test variability criterion. The test is very sensitive. The relative percent										
difference (RPD) between the control and each treatment was calculated and compared to the lower bound.										
The RPD values for all concentrations fall below the lower bound. Any differences observed in this test are considered statistically insignificant.										
Some of the concentrations that were flagged as statistically significant have RPD values that fall below the lower bound. Any differences observed in these concentrations will not be considered statistically significantly decreased from the control.										
$\square$ No statistically significant reductions were observed in this test.										

#### Ceriodaphnia dubia Test Results

Permittee name:	Lowell RWWU	P	ermit number:	MA0100633									
Client sample ID:	Effluent	Test Dates:	1/14/20	1/20/20									
	Concentration - Respon	se Evaluation											
Survival: #11 No concent	tration-response curve: no mortali	ity observed at a	ny concentration	*									
Reproduction: #12 No significa	Reproduction: #12 No significant effects at any test concentration with a relatively flat concentration-response												
curve. Test cond	centrations performed both above		•	•									
control.													
The concentration - response re	elationship was reviewed and the	following deterr	mination was mad	de:									
Survival Reproduction													
XXX	Results are reliable and reportal	ole											
	Results are anomalous (see ex	planation below	·)										
	Results are inconclusive - retest	(see explanation	below)										
	Results Discussion (if	applicable):											

## **TEST METHODS**

#### Ceriodaphnia dubia

**Test type:** Modified Chronic Static Renewal Freshwater Test

**Test Reference Manual:** EPA-821-R-02-013 "Short-Term Methods for Estimating the Chronic Toxicity of

Effluents and Receiving Water to Freshwater Organisms"

Test Method: Ceriodaphnia dubia Survival and Reproduction Test - EPA 1002.0

**Temperature:** 25 °C  $\pm$  1°C (Temperatures should not deviate by more than 3°C during the test)

(required)

Light Quality: Ambient Laboratory Illumination (recommended)

**Light Intensity:** 10-20 μE/m2/s, or 50-100 ft-c (recommended)

**Photoperiod:** 16 hours light, 8 hours dark (recommended)

Test chamber size: 30 mL (recommended minimum)

Test solution volume: 15 mL (recommended minimum)

Renewal of Test Solutions: Daily (required)

**Age of Test Organisms:** Less than 24 hours; and all released within a 8-h period (required)

**Number of Neonates** 

Per Test Chamber: 1 Assigned using blocking by known parentage (required)

**Number of Replicate Test** 

Chambers Per Treatment: 10 (required minimum)

**Number of Neonates Per** 

**Test Concentration:** 10 (required minimum)

**Feeding Regime:** Fed 0.1 mL each of YCT and algal suspension per exposure chamber daily.

(recommended)

Cleaning: Use new plastic cups daily (recommended)

Aeration: None (recommended)

**Test Duration:** Until 60% or more of control females have three broods

(maximum test duration 8 days) (required)

**Endpoints:** Survival and reproduction (required)

Test Acceptability: 80% or greater survival of all control organisms and an average of 15 or more

young per surviving female in the control solutions. 60% of surviving control

females must produce three broods. (required)

Sampling Requirements: Minimum of three samples with a maximum holding time of 36 hours before

first use. (required)

Sample volume required: 1 L/Day (recommended)

# CERIODAPHNIA DUBIA DATASHEETS & STATISTICAL ANALYSIS

# NEW ENGLAND BIOASSAY TOXICITY DATA FORM CHRONIC COVER SHEET

	CHN	DIVIC COVER SHI	261	
CLIENT: I	New England Testing Labora	atories	C.dubia TEST ID #	20-55
ADDRESS:	59 Greenhill Street		CHAIN OF CUSTODY #	·
6	West Warwick, RI 0289	93	NEB PROJECT #	
PERMITTEE:	Lowell RWWU		SAMPLE ID:	Effluent
PERMIT NUMBER:	MA0100633			-
DILUTION WATER:	Laboratory Soft Wate	r		
		INVERTEBRATES		
TEST SE	T-UP TECHNICIAN:	PD		
	TEST SPECIES: Ce	riodaphnia dubia	<del></del>	
	NEB LOT #	Cd20(RMH 005)		
	AGE:	< 24 hours		
TEST SOLUTION	ON VOLUME (mls):	15		
ORGANISMS PE	ER TEST CHAMBER:	1		
ORGANISMS PER	CONCENTRATION:	10		
	Lot Number	Hardness mg/L CaCO <sub>3</sub>	Alkalinity mg/L CaCO <sub>3</sub>	
	C40-S001	CaCO₃ 46	35	
		DATE	TIME	
	TEST START:	1/14/20	1145	
	TEST END:	1/20/20	1214	
COMMENTS:				
· ·				

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**REVIEWED BY:** 

#### NEW ENGLAND BIOASSAY - CHRONIC TOXICITY TEST BROOD DATA SHEET

FACILITY NAME & AD	DRESS: Lowe	al WV	V Utilit	ty, 1st Street Bou	levard, Lowell MA	01850		
NEB PROJECT NUMBER: 05.0044476.00				NEB T	EST NUMBER:	20-55	COC#	C40/1115/16
TEST ORGANISM:	TEST ORGANISM: Ceriodaphnia dubia				<24 hours	Lot #	Cd20(RMH 005)	
START DATE:	1/14/20	TIME:	11	45	END DATE:	1/20/20	TIME:	1214

			Cultur	e Lot#			Cd20(R	MH 00	)5)						
	Cup#	A1	A2	А3	A4	A5	A6	A7	A8	A9	A10	Total Live	# Live	Analyst-	Analyst-
Effluent	Day					Rep	licate					Young	Adults	Transfer	Counts
Concentration	Number	Α	В	С	D	E	F	G	Н	1	J				
	0	<b>√</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10	PD	
	1	<b>✓</b>	✓	✓	1	✓	✓	✓	✓	<b>✓</b>	✓	0	10	CW	
	2	<b>√</b>	✓	<b>√</b>	✓	✓	✓	✓	✓	✓	✓	0	10	ко	
NEB Lab	3	✓	✓	✓	✓	✓	<b>√</b>	✓	✓	✓	✓	0	10	cw	CW
Synthetic	4	6	4	4	6	5	4	6	6	8	7	56	10	CW	CW
Diluent	5	8	10	12	13	9	12	12	10	10	11	107	10	CW	cw
	6	10	15	16	16	12	16	12	16	16	13	142	10	СН	СН
	7														
	totals	24	29	32	35	26	32	30	32	34	31	305	10		MC
		Α	В	С	D	E	F	G	Н	1	J				
	0	✓	✓	✓	✓	✓	✓	✓	√ √	✓	✓	0	10	2	
	1	✓	✓	✓	✓	✓	✓	<b>✓</b>	✓	✓	✓	0	10		13.5
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
Merrimack	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
River	4	7	7	7	6	7	6	5	6	6	9	66	10		
Control	5	14	14	15	10	16	8	10	13	15	14	129	10		
	6	13	20	14	17	9	✓	19	15	14	19	140	10		
	7														Lite
	totals	34	41	36	33	32	14	34	34	35	42	335	10		
		Α	В	С	D	Е	F	G	Н	1	J				
	0	<b>√</b>	<b>✓</b>	✓	<b>√</b>	✓	<b>√</b>	✓	✓	✓	✓	0	10	\$ 15.00A	
	1	✓	✓	✓	✓	<b>✓</b>	✓ .	✓	✓	✓	✓	0	10		
	2	✓	<b>√</b>	✓	✓	<b>✓</b>	<b>✓</b>	✓	✓	✓	✓	0	10		
	3	✓	✓	✓	<b>√</b>	✓	✓	✓	✓	✓	<b>√</b>	0	10		
6.25%	4	5	6	5	6	7	6	7	5	8	8	63	10		BT.
	5	8	10	13	13	16	10	14	13	15	15	127	10		
	6	5	17	12	2	8	<b>✓</b>	12	12	8	11	87	10		
	7														
															ШЛ
	totals	18	33	30	21	31	16	33	30	31	34	277	10		


#### NEW ENGLAND BIOASSAY - CHRONIC TOXICITY TEST BROOD DATA SHEET

FACILITY NAME & ADDRESS: Lowell Regional WW Utility, 1st Street Boulevard, Lowell MA 01850

NEB PROJECT NUMBER: 05.0044476.00 ORGANISM: Ceriodaphnia dubia START DATE: 1/14/20

												T-4-1			
Eco	-					Ren	licate					Total Live	# Live Adults		1
Effluent Concentration	Day Number	Α	В	С	D	E	F	G	Н	1	J	Young	Adults		
	0	<b>√</b>	1	1	1	<b>√</b>	1	<b>V</b>	<b>V</b>	<b>V</b>	<b>√</b>	0	10		
	1	<b>√</b>	<b>√</b>	<b>√</b>	1	1	1	<b>√</b>	<b>√</b>	<b>V</b>	<b>√</b>	0	10		
	2	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>	<b>✓</b>	1	<b>√</b>	<b>√</b>	<b>V</b>	<b>√</b>	0	10		
	3	✓	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>	<b>✓</b>	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>	0	10		
12.5%	4	6	5	8	6	8	5	7	5	6	7	63	10		
12.5%	5	11	9	2	13	3	16	14	9	14	12	103	10		
	6	15	16	1	20	2	16	19	16	2	17	124	10	2.0	
	7														
	totals	32	30	11	39	13	37	40	30	22	36	290	10		
		Α	В	С	D	E	F	G	Н	L	J			1.5	
	0	✓	✓	✓	✓	✓	<b>√</b>	<b>√</b>	<b>√</b>	✓	✓	0	10		
	1	✓	✓	✓	✓	✓	<b>✓</b>	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓	<b>✓</b>	✓	✓	✓	✓	0	10		100
	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
25%	4	5	✓	5	6	8	7	3	6	7	✓	47	10	( - ·	11.25
	5	10	13	10	13	12	11	12	12	12	12	117	10		
	6	11	8	6	19	11	15	15	19	18	<b>√</b>	122	10		
	7														
	totals	26	21	21	38	31	33	30	37	37	12	286	10		
		Α	В	С	D	E	F	G	Н	1	J				
	0	<b>√</b>	√	<b>√</b>	<b>√</b>	0	10								
	1	<b>√</b>	0	10											
	2	<b>√</b>	0	10											
F00/	3	<b>√</b>		<b>√</b>	<b>✓</b>	<b>✓</b>	<b>√</b>	<b>✓</b>	<b>√</b>	<b>√</b>	<b>✓</b>	0	10		
50%	4	4	7	5	4	8	6	5	5	7	6	57	10		
	5	10	14	13	12	12	13	12	13	15	15	129	10		-
	6	14	17	16	<b>✓</b>	19	17	18	12	16	18	147	10		-
	7						_								
	totolo	28	20	24	1.0	20	26	25	20	20	20	222	10		
	totals		38	34	16	39	36	35	30	38	39	333	10		
1	0	A ✓	B √	C ✓	D ✓	E ✓	F √	G ✓	H	1	J	_	10		
			_				_			_		0	10		
	1	<b>√</b>	√ /	<b>√</b>	0	10									
	2	√ √	√ √	√ √	✓ ✓	✓ ✓	<b>✓</b>	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>	0	10		
100%	3			7	5		8	7	5	_	✓ ✓		10		
100%		6	6	-	-	6				6		56	10		-
	5	16	12	14	10	12	12	10	12	14	10	122	10		
	6	13	16	13	17	16	12	14	15	13	13	142	10		
	7										-				
	totals	35	34	24	32	24	วา	21	22	22	22	220	10		
	totals	33	54	34	52	34	32	31	32	33	23	320	10		

Report Date:

21 Jan-20 10:04 (p 1 of 6)

Test Code/ID: 20-55 / 19-7981-7232 Ceriodaphnia 7-d Survival and Reproduction Test **New England Bioassay** Analysis ID: 07-5652-9654 Endpoint: 2d Survival Rate **CETIS Version:** CETISv1.9.4 Analyzed: 21 Jan-20 10:03 Analysis: Linear Interpolation (ICPIN) Status Level: Batch ID: 04-6623-7566 Test Type: Reproduction-Survival (7d) Analyst: Start Date: 14 Jan-20 11:45 EPA/821/R-02-013 (2002) Protocol: Diluent: Laboratory Water Ending Date: 20 Jan-20 12:14 Species: Ceriodaphnia dubia Brine: Not Applicable Test Length: 6d 0h Taxon: Branchiopoda Source: In-House Culture Age: <24 Sample ID: 05-0947-0498 Code: 1E5DE722 Project: Sample Date: 13 Jan-20 07:00 Material: **WWTF Effluent** Source: Lowell RWWU (MA0100633) Receipt Date: 13 Jan-20 15:10 CAS (PC): Station: Sample Age: 29h Client: New England Testing Labs **Linear Interpolation Options** X Transform Y Transform Exp 95% CL Seed Resamples Method Log(X) Linear 1615663 200 Yes Two-Point Interpolation **Point Estimates** Level % 95% LCL 95% UCL TU 95% LCL 95% UCL LC50 >100 <1 n/a n/a n/a 2d Survival Rate Summary Calculated Variate(A/B) Isotonic Variate Conc-% Code Count Mean Min Max Std Dev CV% %Effect A/B Mean %Effect 0 D 10 1.0000 1.0000 1.0000 0.0000 0.00% 0.0% 10/10 0.0% 1 6.25 10 1.0000 1.0000 1.0000 0.0000 0.00% 0.0% 10/10 0.0% 1 12.5 10 1.0000 1.0000 1.0000 0.0000 0.00% 0.0% 10/10 0.0% 1 25 10 1.0000 1.0000 1.0000 0.0000 0.00% 0.0% 10/10 1 0.0% 50 10 1.0000 1.0000 1.0000 0.0000 0.00% 0.0% 10/10 0.0% 1 100 10 1.0000 1.0000 1.0000 0.0000 0.00% 0.0% 10/10 0.0% 1 2d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1,0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1,0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1:0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

#### 2d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

000-222-335-4

CETIS™ v1.9.4.1

Analyst:\_ QA:

Report Date:

21 Jan-20 10:04 (p 2 of 6)

Test Code/ID:

20-55 / 19-7981-7232

Ceriodaphnia 7-d Survival and Reproduction Test

**New England Bioassay** 

Analyzed:

Analysis ID: 07-5652-9654 21 Jan-20 10:03 Endpoint: 2d Survival Rate

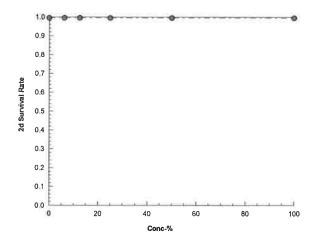
Analysis:

Linear Interpolation (ICPIN)

**CETIS Version:** Status Level:

CETISv1.9.4 1

**Graphics** 



Analyst:\_ QA:

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Report Date:

21 Jan-20 10:04 (p 1 of 4)

t Code/ID: 20-55 / 19-7981-73

CETIS Analy	ушсан керс	ort					•	Code/ID:	21	20-55 / 1	9-7981-723
Ceriodaphnia 7	-d Survival and	d Repro	duction Test	t					ı	lew Englan	d Bioassay
Analysis ID: 0	9-5853-8932		Endpoint: 2	d Survival Ra	ate		CET	S Versior	ı: CETISv	1.9.4	
Analyzed: 2	1 Jan-20 10:03		<b>Analysis</b> : S	TP 2xK Cont	ingency Tab	les	Stati	ıs Level:	1		
Batch ID: 0	4-6623-7566		Test Type: R	eproduction-	Survival (7d)		Anal	yst:			
Start Date: 1	4 Jan-20 11:45	1	Protocol: E	PA/821/R-02	2-013 (2002)		Ditue	ent: La	boratory Wa	iter	
Ending Date: 2	0 Jan-20 12:14	:	Species: C	eriodaphnia	dubia		Brine	e: No	t Applicable		
Test Length: 6	id Oh		Taxon: B	ranchiopoda			Sour	ce: In-	House Cultu	ıre	Age: <2
Sample ID: 0	5-0947-0498		Code: 1	E5DE722			Proje	ect:			
Sample Date: 1	3 Jan-20 07:00	I	Material: V	WTF Effluer	nt		Sour	ce: Lo	well RWWU	(MA010063	33)
Receipt Date: 1	3 Jan-20 15:10		CAS (PC):				Stati	on:			
Sample Age: 2	9h		Client: N	lew England	Testing Labs						
Data Transform		Alt Hy	/p				NOEL	LOEL	TOEL	TU	
Untransformed		C > T					100	>100	n/a	1	
Fisher Exact/Bo	onferroni-Holm	Test									
Control vs	Group		Test Sta	t P-Type	P-Value	Decision	ι(α:5%)				
Dilution Water	6.25		1.0000	Exact	1.0000	Non-Sign	ificant Effect				
	12.5		1.0000	Exact	1.0000	Non-Sign	ificant Effect				
	25		1.0000	Exact	1.0000	-	ificant Effect				
	50		1.0000	Exact	1.0000		ificant Effect				
	100		1.0000	Exact	1.0000	Non-Sign	ificant Effect				
Data Summary											
Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect				
0	D	10	0	10	1	0	0.0%				
6.25		10	0	10	1	0	0.0%				
12.5		10	0	10	1	0	0.0%				
25		10	0	10	1	0	0.0%				
50		10	0	10	1	0	0.0%				
100		10	0	10	1	0	0.0%				
2d Survival Rat	e Detail										
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1,0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1,0000	1.0000	1.0000	1.0000	1.0000	1.0000	1,0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1:0000	1.0000
2d Survival Rate	e Binomials										
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0-		4.14	4.64	4.14	4.14	4.44	4.4	4.44		4.14	

000-222-335-4 CETIS™ v1.9.4.1 Analyst:\_\_\_\_\_ QA:\_\_\_\_

Report Date: Test Code/ID: 21 Jan-20 10:04 (p 2 of 4)

20-55 / 19-7981-7232

Ceriodaphnia 7-d Survival and Reproduction Test

**New England Bioassay** 

Analysis ID: Analyzed:

09-5853-8932

2d Survival Rate Endpoint:

**CETIS Version:** 

CETISv1.9.4

21 Jan-20 10:03

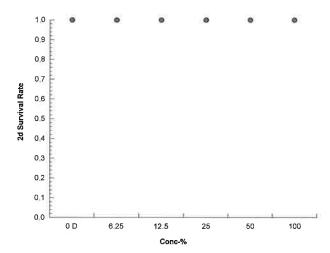
Analysis:

STP 2xK Contingency Tables

Status Level:

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Analyst:\_\_ QA:\_

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Report Date:

21 Jan-20 10:04 (p 3 of 6)

CETIS	Ana	атупсат керс	ort					•	t Code/ID:			9-7981-723
Cerioda	aphnia	a 7-d Survival and	d Reprodu	ction Te	est					N	lew Englan	d Bioassay
Analysi	is ID:	19-2039-5676	End	point:	6d Survival Ra	te			TIS Version	CETISv	1.9.4	
Analyze	ed:	21 Jan-20 10:03	Ana	lysis:	Linear Interpol	ation (ICPIN	l)	Sta	tus Level:	1		
Batch I	D:	04-6623-7566	Test	Type:	Reproduction-	Survival (7d)	)	Ana	alyst:			
Start Da		14 Jan-20 11:45		ocol:	EPA/821/R-02	-013 (2002)		Dilu	uent: Lab	oratory Wa	ter	
_		20 Jan-20 12:14	Spe	cies:	Ceriodaphnia o	lubia		Brii	ne: Not	Applicable		
Test Le	ength:	6d 0h	Tax	on:	Branchiopoda			Sou	ırce: In-l	House Cultu	іге	Age: <24
Sample	D:	05-0947-0498	Cod	e:	1E5DE722			Pro	ject:			
Sample	Date:	: 13 Jan-20 07:00	Mate	erial:	WWTF Effluen	t		Sou	ırce: Lov	vell RWWU	(MA010063	33)
Receipt	t Date:	: 13 Jan-20 15:10	CAS	(PC):				Sta	tion:			
Sample	Age:	29h	Clie	nt:	New England 1	Testing Labs	3					
Linear I	Interpo	olation Options										
X Trans	sform	Y Transform	See.	d	Resamples	Exp 95%	CL Meth	nod				
Log(X)		Linear	5772	227	200	Yes	Two-	Point Inter	polation			
Point E	stimat	tes										
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL						
_C50	>100		n/a	<1	n/a	n/a						
6d Surv	vival R	Rate Summary				Calcu	ulated Varia	te(A/B)			Isotor	nic Variate
Conc-%	6	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0		D	10	1.000	0 1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
6.25			10	1.000		1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
12.5			10	1.000		1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
25			10	1.000		1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
50			10	1.000		1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
100			10	1.000	0 1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
		tate Detail										
Conc-%	<u></u>	Code	Rep 1	Rep 2		Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
)		Đ	1.0000	1.000		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
5.25			1.0000	1.000		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5			1.0000	1.000		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25			1.0000	1.000		1,0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50			1.0000	1.000		1.0000	1.0000	1.0000	1.0000	1,0000	1,0000	1.0000
100			1,0000	1.000	0 1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6d Surv	∕ival R	ate Binomials										
Conc-%	, 0	Code	Rep 1	Rep 2		Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
)		D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
5.25			1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5			1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25			1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
			4.14	4 4 4								

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Report Date:

21 Jan-20 10:04 (p 4 of 6)

Test Code/ID:

20-55 / 19-7981-7232

Ceriodaphnia 7-d Survival and Reproduction Test

**New England Bioassay** 

Analyzed:

**Analysis ID:** 19-2039-5676

Endpoint: 6d Survival Rate

**CETIS Version:** 

n: CETISv1.9.4

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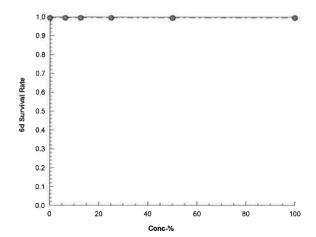
21 Jan-20 10:03

Analysis: Linear Interpolation (ICPIN)

Status Level:

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Graphics



Analyst:\_\_\_\_\_ QA:\_\_\_\_

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Report Date:

21 Jan-20 10:04 (p 3 of 4)

							Test Code/ID: 20-55 / 19-79				9-7981-723
Ceriodaphnia	a 7-d Survival an	d Reprodu	uction Test						N	lew Englan	ıd Bioassa
Analysis ID:	18-2195-9980	En		Survival Ra			CET	IS Versio	n: CETISv	1.9.4	
Analyzed:	21 Jan-20 10:03	An:	alysis: ST	P 2xK Cont	ingency Tab	les	Stati	us Level:	1		
Batch ID:	04-6623-7566	Tes	st Type: Re	production-	Survival (7d)		Anal	yst:			
Start Date:	14 Jan-20 11:45	Pro	otocol: EP	A/821/R-02	-013 (2002)		Dilue		aboratory Wa	iter	
Ending Date:	: 20 Jan-20 12:14	Spe	ecies: Ce	riodaphnia (	dubia		Brine	e: N	ot Applicable		
Test Length:	6d 0h	Tax	kon: Bra	anchiopoda			Sour	rce: Ir	-House Cultu	ıre	Age: <2
Sample ID:	05-0947-0498	Co	de: 1E	5DE722			Proje	ect:			
Sample Date	: 13 Jan-20 07:00	Ma	terial: WV	NTF Effluer	nt		Sour	rce: L	owell RWWU	(MA010063	33)
Receipt Date	: 13 Jan-20 15:10	CA	S (PC):				Stati	on:			
Sample Age:	29h	Cli	ent: Ne	w England	Testing Labs	i					
Data Transfo	rm	Alt Hyp					NOEL	LOEL	TOEL	TU	
Untransforme	d	C > T					100	>100	n/a	1	
Fisher Exact	/Bonferroni-Holm	n Test									
Control	vs Group		Test Stat	P-Type	P-Value	Decision	ι(α:5%)				
Dilution Wate	г 6.25		1.0000	Exact	1.0000	Non-Sign	nificant Effect				
	12.5		1.0000	Exact	1.0000	Non-Sigr	nificant Effect	i			
	25		1.0000	Exact	1.0000	Non-Sign	nificant Effect	:			
	50		1.0000	Exact	1.0000	_	nificant Effect				
	100		1.0000	Exact	1.0000	Non-Sign	nificant Effect				
Data Summa	ry										
Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect				
0	D	10	0	10	1	0	0.0%				
6.25		10	0	10	1	0	0.0%				
12.5		10	0	10	1	0	0.0%				
25		10	0	10	1	0	0.0%				
50 100		10 10	0	10	1	0	0.0%				
		10	0	10	3.	U	0.0%				
6d Survival R											
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1,0000	1.0000	1.0000
6.25 43.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1,0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1,0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1,0000	1,0000	1.0000
6d Survival R	Rate Binomials										
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
F0		4 14	4 14	4.14	4 14	414	4 /4	414	4.14	4.14	4 14

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Report Date: Test Code/ID: 21 Jan-20 10:04 (p 4 of 4)

20-55 / 19-7981-7232

Ceriodaphnia 7-d Survival and Reproduction Test

**New England Bioassay** 

Analysis ID: Analyzed:

18-2195-9980 21 Jan-20 10:03

Analysis:

Endpoint: 6d Survival Rate

STP 2xK Contingency Tables

**CETIS Version:** 

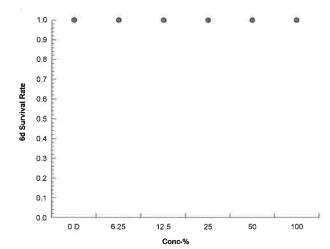
CETISv1.9.4

Status Level:

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**Graphics** 

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Report Date: Test Code/ID:

21 Jan-20 10:04 (p 1 of 2) 20-55 / 19-7981-7232

	a 7-d S	Survival an	d Reprodu	ction Test						N	ew England	d Bioassa
Analysis ID:		520-9442		-	production				IS Version		1.9.4	
Analyzed:	21 J	an-20 10:03	An	alysis: No	nparametric	-Control vs	Treatments	State	us Level:	1		
Batch ID:	04-6	623-7566	Tes	t Type: Re	production-S	Survival (7d)		Anal	yst:			
Start Date:	14 Ja	an-20 11:45	Pro	tocol: EF	PA/821/R-02-	013 (2002)		Dilue	ent: La	boratory Wa	ter	
Ending Date:	20 Ja	an-20 12:14	Sp	ecies: Ce	riodaphnia d	ubia		Brin	e: No	t Applicable		
Test Length:	6d 0	)h	Tax	on: Br	anchiopoda			Soul	rce: In-	House Cultu	re	Age: <2
Sample ID:	05-0	947-0498	Co	de: 1E	5DE722			Proje	ect:			
Sample Date:				terial: W	WTF Effluent	t		Soul	rce: Lo	well RWWU	(MA010063	3)
Receipt Date:		an-20 15:10	CA	S (PC):				Stati	on:			
Sample Age:	29h		Cli	ent: Ne	w England T	esting Labs	i					
Data Transfo			Alt Hyp					NOEL	LOEL	TOEL	TU	PMSD
Untransforme	d		C > T					100	>100	n/a	1	23.73%
Steel Many-O	ne Ra	ınk Sum Te	est									
	vs	Conc-%		Test Stat			P-Type	P-Value	Decisio			
Dilution Water	r	6.25		95.5	75		Asymp	0.5455	_	nificant Effec		
		12.5		108.5	75		Asymp	0.9005		nificant Effec		
		25		102.5	75		Asymp	0.7709	-	nificant Effec		
		50		128.5	75		Asymp	0.9991	_	nificant Effec		
		100		122	75 	4 18	Asymp	0.9941	Non-Sigi	nificant Effec	:t 	
Test Accepta	bility	Criteria	TAC	_imits								
Attribute		Test Stat	Lower	Upper	Overlap	Decision						
Control Resp		30.5	15	>>	Yes	Passes C	riteria					
ANOVA Table	•											
Source		Sum Squa	ares	Mean Sq	uare	DF	F Stat	P-Value	Decisio	<u> </u>		
Between				40 0707		_	0.9278	0 4700	Mon Cir.	nificant Effec	t	
		231.883		46.3767		5	0.5270	0.4703	Non-Sigi			
Error		2699.1		49.9833		54	0.9270	0.4703	Non-Sigi	ount Endo		
Error								0.4703	Non-Sigi			
Error Total	l Test	2699.1 2930.98				54	- 0.9276	0.4703	Non-Sigi			
Error Total Distributional	l Test	2699.1 2930.98				54	-	0.4703	Decision			
Error Total Distributional Attribute	l Test	2699.1 2930.98 s Test	uality of Va			54 59	-		Decision			
Error Total <b>Distributiona</b> l <b>Attribute</b> Variances	l Test:	2699.1 2930.98 s Test	•	49.9833		54 59 Test Stat	Critical	P-Value	<b>Decision</b> Unequal	n(α:1%)		
Error Total <b>Distributional</b> <b>Attribute</b> Variances Distribution		2699.1 2930.98 s Test Bartlett Eq Shapiro-W	•	49.9833		54 59 <b>Test Stat</b> 16.1	Critical 15.09	<b>P-Value</b> 0.0066	<b>Decision</b> Unequal	n(α:1%) Variances		
Error Total  Distributional  Attribute  Variances  Distribution  Reproduction		2699.1 2930.98  Test Bartlett Eq Shapiro-W mary Code	Count	49.9833  ariance Test nality Test  Mean	95% LCL	54 59 <b>Test Stat</b> 16.1 0.9112 <b>95% UCL</b>	Critical 15.09 0.9459	P-Value 0.0066 3.5E-04	<b>Decision</b> Unequal	n(α:1%) Variances		%Effect
Error Total  Distributional Attribute Variances Distribution Reproduction Conc-%		2699.1 2930.98 s Test Bartlett Eq Shapiro-W	Count	49.9833  ariance Test nality Test  Mean 30.5	<b>95% LCL</b> 28.06	54 59 <b>Test Stat</b> 16.1 0.9112 <b>95% UCL</b> 32.94	Critical 15.09 0.9459 Median 31.5	P-Value 0.0066 3.5E-04 Min 24	Decision Unequal Non-Nor	n(α:1%) Variances mal Distribut Std Err 1.078	ion  CV%  11.17%	0.00%
Error Total  Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25		2699.1 2930.98  Test Bartlett Eq Shapiro-W mary Code	Count 10 10	49.9833  Ariance Test  Mean 30.5 27.7	<b>95% LCL</b> 28.06 22.91	54 59 <b>Test Stat</b> 16.1 0.9112 <b>95% UCL</b> 32.94 32.49	Critical 15.09 0.9459 Median 31.5 30.5	P-Value 0.0066 3.5E-04  Min 24 16	Decision Unequal Non-Nor Max 35 34	n(α:1%) Variances mal Distribut  Std Err  1.078 2.119	CV% 11.17% 24.19%	0.00% 9.18%
Error Total  Distributional Attribute Variances Distribution Reproduction Conc-% 0 5,25 12.5		2699.1 2930.98  Test Bartlett Eq Shapiro-W mary Code	Count 10 10 10	49.9833  Arriance Test  Mean  30.5  27.7  29	<b>95% LCL</b> 28.06 22.91 21.56	54 59 <b>Test Stat</b> 16.1 0.9112 <b>95% UCL</b> 32.94 32.49 36.44	Critical 15.09 0.9459 Median 31.5 30.5 31	P-Value 0.0066 3.5E-04  Min 24 16 11	Decision Unequal Non-Nor Max 35 34 40	n(α:1%) Variances mal Distribut  Std Err  1.078 2.119 3.29	CV% 11.17% 24.19% 35.87%	0.00% 9.18% 4.92%
Error Total  Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5		2699.1 2930.98  Test Bartlett Eq Shapiro-W mary Code	Count 10 10 10	49.9833  Ariance Test  Mean  30.5  27.7  29  28.6	95% LCL 28.06 22.91 21.56 22.5	54 59 <b>Test Stat</b> 16.1 0.9112 <b>95% UCL</b> 32.94 32.49 36.44 34.7	Critical 15.09 0.9459  Median 31.5 30.5 31 30.5	P-Value 0.0066 3.5E-04  Min 24 16 11 12	Decision Unequal Non-Nor Max 35 34 40 38	Std Err 1.078 2.119 3.29 2.696	CV% 11.17% 24.19% 35.87% 29.81%	0.00% 9.18% 4.92% 6.23%
Error Total  Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25		2699.1 2930.98  Test Bartlett Eq Shapiro-W mary Code	Count 10 10 10 10 10	49.9833  Ariance Test  Mean  30.5  27.7  29  28.6  33.3	95% LCL 28.06 22.91 21.56 22.5 28.2	54 59 Test Stat 16.1 0.9112 95% UCL 32.94 32.49 36.44 34.7 38.4	Critical 15.09 0.9459 Median 31.5 30.5 31 30.5 35.5	P-Value 0.0066 3.5E-04 Min 24 16 11 12 16	Decision Unequal Non-Nor Max 35 34 40 38 39	n(α:1%) Variances mal Distribut  Std Err  1.078 2.119 3.29 2.696 2.256	CV% 11.17% 24.19% 35.87% 29.81% 21.42%	0.00% 9.18% 4.92% 6.23% -9.18%
Error Fotal  Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25		2699.1 2930.98  Test Bartlett Eq Shapiro-W mary Code	Count 10 10 10	49.9833  Ariance Test  Mean  30.5  27.7  29  28.6	95% LCL 28.06 22.91 21.56 22.5	54 59 <b>Test Stat</b> 16.1 0.9112 <b>95% UCL</b> 32.94 32.49 36.44 34.7	Critical 15.09 0.9459  Median 31.5 30.5 31 30.5	P-Value 0.0066 3.5E-04  Min 24 16 11 12	Decision Unequal Non-Nor Max 35 34 40 38	Std Err 1.078 2.119 3.29 2.696	CV% 11.17% 24.19% 35.87% 29.81%	0.00% 9.18% 4.92% 6.23%
Error Fotal  Distributional Attribute Variances Distribution  Reproduction  Conc-% 0 6.25 12.5 25 60 100  Reproduction	n Sum	2699.1 2930.98 s Test Bartlett Eq Shapiro-W mary Code D	Count 10 10 10 10 10 10	49.9833  Ariance Test  Mean  30.5  27.7  29  28.6  33.3  32	95% LCL 28.06 22.91 21.56 22.5 28.2 29.57	54 59 Test Stat 16.1 0.9112 95% UCL 32.94 32.49 36.44 34.7 38.4 34.43	Critical 15.09 0.9459 Median 31.5 30.5 31 30.5 35.5 32.5	P-Value 0.0066 3.5E-04 Min 24 16 11 12 16 23	Decision Unequal Non-Nor  Max 35 34 40 38 39 35	Std Err 1.078 2.119 3.29 2.696 2.256 1.075	CV% 11.17% 24.19% 35.87% 29.81% 21.42% 10.62%	0.00% 9.18% 4.92% 6.23% -9.18% -4.92%
Error Total  Distributional Attribute Variances Distribution  Reproduction  Conc-%  0  3.25  12.5  25  50  100  Reproduction	n Sum	2699.1 2930.98 s Test Bartlett Eq Shapiro-W mary Code D	Count 10 10 10 10 10 10 10 Rep 1	### 49.9833  ##################################	95% LCL 28.06 22.91 21.56 22.5 28.2 29.57	54 59 Test Stat 16.1 0.9112 95% UCL 32.94 32.49 36.44 34.7 38.4 34.43	Critical 15.09 0.9459  Median 31.5 30.5 31 30.5 35.5 32.5	P-Value 0.0066 3.5E-04  Min 24 16 11 12 16 23	Decision Unequal Non-Nor  Max 35 34 40 38 39 35	n(α:1%) Variances mal Distribut  Std Err  1.078 2.119 3.29 2.696 2.256 1.075  Rep 8	CV% 11.17% 24.19% 35.87% 29.81% 21.42% 10.62%  Rep 9	0.00% 9.18% 4.92% 6.23% -9.18% -4.92%
Error Total  Distributional Attribute Variances Distribution  Reproduction  Conc-%  0  3.25  12.5  25  100  Reproduction  Conc-%	n Sum	2699.1 2930.98 s Test Bartlett Eq Shapiro-W mary Code D	Count 10 10 10 10 10 10 10 10 24	### 49.9833  ##################################	95% LCL 28.06 22.91 21.56 22.5 28.2 29.57	54 59 Test Stat 16.1 0.9112 95% UCL 32.94 32.49 36.44 34.7 38.4 34.43	Critical 15.09 0.9459  Median 31.5 30.5 31 30.5 35.5 32.5	P-Value 0.0066 3.5E-04 Min 24 16 11 12 16 23	Decision Unequal Non-Nor  Max  35 34 40 38 39 35  Rep 7	n(α:1%) Variances mal Distribut  Std Err  1.078 2.119 3.29 2.696 2.256 1.075  Rep 8	CV% 11.17% 24.19% 35.87% 29.81% 21.42% 10.62%	0.00% 9.18% 4.92% 6.23% -9.18% -4.92% Rep 10
Error Total  Distributional Attribute Variances Distribution Reproduction 0.6.25 12.5 25 50 100  Reproduction Conc-% 0.6.25 100  Conc-% 0.6.25	n Sum	2699.1 2930.98 s Test Bartlett Eq Shapiro-W mary Code D	Count 10 10 10 10 10 10 10 24 18	### 49.9833  ### Application   ### Application	95% LCL 28.06 22.91 21.56 22.5 28.2 29.57 Rep 3 32 30	54 59 Test Stat 16.1 0.9112 95% UCL 32.94 32.49 36.44 34.7 38.4 34.43 Rep 4 35 21	Critical 15.09 0.9459  Median 31.5 30.5 31 30.5 35.5 32.5  Rep 5 26 31	P-Value 0.0066 3.5E-04  Min 24 16 11 12 16 23  Rep 6 32 16	Decision Unequal Non-Nor  Max 35 34 40 38 39 35	Std Err 1.078 2.119 3.29 2.696 2.256 1.075  Rep 8 32 30	cv% 11.17% 24.19% 35.87% 29.81% 21.42% 10.62%  Rep 9 34 31	0.00% 9.18% 4.92% 6.23% -9.18% -4.92%
Error Total  Distributional Attribute Variances Distribution Reproduction 3.25 12.5 25 100 Reproduction Conc-%	n Sum	2699.1 2930.98 s Test Bartlett Eq Shapiro-W mary Code D	Count 10 10 10 10 10 10 10 10 24	### 49.9833  ##################################	95% LCL 28.06 22.91 21.56 22.5 28.2 29.57 Rep 3	54 59 Test Stat 16.1 0.9112 95% UCL 32.94 32.49 36.44 34.7 38.4 34.43	Critical 15.09 0.9459  Median 31.5 30.5 31 30.5 35.5 32.5	P-Value 0.0066 3.5E-04  Min 24 16 11 12 16 23  Rep 6	Decision Unequal Non-Nor  Max  35 34 40 38 39 35  Rep 7	n(α:1%) Variances mal Distribut  Std Err  1.078 2.119 3.29 2.696 2.256 1.075  Rep 8	CV% 11.17% 24.19% 35.87% 29.81% 21.42% 10.62%  Rep 9 34	0.00% 9.18% 4.92% 6.23% -9.18% -4.92% Rep 10
Error Total  Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25 50 1100 Reproduction Conc-% 0 6.25 12.5 12.5	n Sum	2699.1 2930.98 s Test Bartlett Eq Shapiro-W mary Code D	Count 10 10 10 10 10 10 10 24 18	### 49.9833  ### Application   ### Application	95% LCL 28.06 22.91 21.56 22.5 28.2 29.57 Rep 3 32 30	54 59 Test Stat 16.1 0.9112 95% UCL 32.94 32.49 36.44 34.7 38.4 34.43 Rep 4 35 21	Critical 15.09 0.9459  Median 31.5 30.5 31 30.5 35.5 32.5  Rep 5 26 31	P-Value 0.0066 3.5E-04  Min 24 16 11 12 16 23  Rep 6 32 16	Decision Unequal Non-Nor  Max 35 34 40 38 39 35  Rep 7 30 33	Std Err 1.078 2.119 3.29 2.696 2.256 1.075  Rep 8 32 30	cv% 11.17% 24.19% 35.87% 29.81% 21.42% 10.62%  Rep 9 34 31	0.00% 9.18% 4.92% 6.23% -9.18% -4.92% Rep 10 31 34
Error Total  Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25 50 100  Reproduction Conc-% 0 6.25 12.5 25 50 100	n Sum	2699.1 2930.98 s Test Bartlett Eq Shapiro-W mary Code D	Count  10 10 10 10 10 10 24 18 32	### 49.9833  ### Application   ### Application	95% LCL 28.06 22.91 21.56 22.5 28.2 29.57  Rep 3 32 30 11	54 59 Test Stat 16.1 0.9112 95% UCL 32.94 32.49 36.44 34.7 38.4 34.43 Rep 4 35 21 39	Critical 15.09 0.9459  Median 31.5 30.5 31 30.5 35.5 32.5  Rep 5 26 31 13	P-Value 0.0066 3.5E-04  Min 24 16 11 12 16 23  Rep 6 32 16 37	Decision Unequal Non-Nor  Max 35 34 40 38 39 35  Rep 7 30 33 40	n(α:1%) Variances mal Distribut  Std Err  1.078 2.119 3.29 2.696 2.256 1.075  Rep 8 32 30 30	cv% 11.17% 24.19% 35.87% 29.81% 21.42% 10.62%  Rep 9 34 31 22	0.00% 9.18% 4.92% 6.23% -9.18% -4.92% Rep 10 31 34 36

000-222-335-4

CETIS™ v1.9.4.1

Analyst: QA:

Report Date: Test Code/ID: 21 Jan-20 10:04 (p 2 of 2) 20-55 / 19-7981-7232

Ceriodaphnia 7-d Survival and Reproduction Test

**New England Bioassay** 

Analyzed:

**Analysis ID:** 17-8520-9442 21 Jan-20 10:03 Endpoint: Reproduction

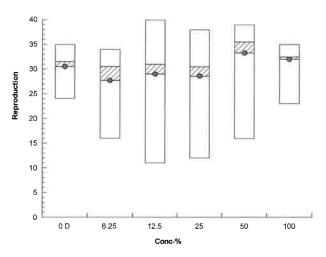
Analysis:

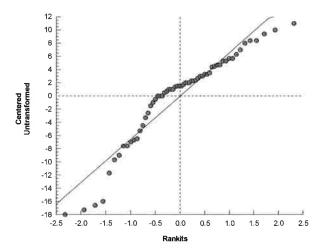
Nonparametric-Control vs Treatments

**CETIS Version:** CETISv1.9.4

Status Level: 1







Report Date: Test Code/ID: 21 Jan-20 10:04 (p 5 of 6)

20-55 / 19-7981-7232

							Tes	t Code/ID:		20-55 / 1	19-7981-7232
Ceriodaphnia	a 7-d Survival an	d Reprodu	ction T	est					N	ew Englan	d Bioassay
Analysis ID:	16-3497-5334	End	point:	Reproduction			CE.	TIS Version:	: CETISv1	.9.4	
Analyzed:	21 Jan-20 10:03	8 Ana	lysis:	Linear Interpola	ation (ICPIN	)	Sta	tus Level:	1		
Batch ID:	04-6623-7566	Test	t Type:	Reproduction-S	Survival (7d)		Ana	alyst:			
Start Date:	14 Jan-20 11:45	Prot	tocol:	EPA/821/R-02-	013 (2002)		Dilu	uent: Lab	oratory Wat	er	
Ending Date:	20 Jan-20 12:14	Spe	cies:	Ceriodaphnia d	lubia		Brit	ne: Not	Applicable		
Test Length:	6d 0h	Tax	on:	Branchiopoda			Sou	urce: In-l	House Cultur	е	Age: <24
Sample ID:	05-0947-0498	Cod	e:	1E5DE722			Pro	ject:			
Sample Date:	: 13 Jan-20 07:00	Mate	erial:	WWTF Effluen	t		Sou	urce: Lov	vell RWWU	(MA01006	33)
Receipt Date	: 13 Jan-20 15:10	CAS	(PC):				Sta	tion:			
Sample Age:	29h	Clie	nt:	New England T	esting Labs	1					
Linear Interp	olation Options										
X Transform	Y Transform	n See	d	Resamples	Exp 95%	CL Met	hod				
Linear	Linear	1907	7160	200	Yes	Two	-Point Inter	polation			
Test Accepta	bility Criteria	TAC L	imits								
Attribute	Test Stat		Uppe	r Overlap	Decision						
Control Resp	30.5	15	>>	Yes	Passes C	riteria					
Point Estimat	tes										
Level %	95% LCL	95% UCL	TU	95% LCL	95% UCL						
IC25 >100	) n/a	n/a	<1	n/a	n/a						
C50 >100	) n/a	n/a	<1	n/a	n/a						
Reproduction	n Summary				Cal	Iculated Va	riate			Isoto	nic Variate
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect		Mean	%Effect
)	D	10	30.5	24	35	3.408	11.17%	0.0%		30.5	0.0%
6.25		10	27.7	16	34	6.701	24.19%	9.18%		30.12	1.25%
12.5		10	29	11	40	10.4	35.87%	4.92%		30.12	1.25%
25		10	28.6	12	38	8.527	29.81%	6.23%		30.12	1.25%
50		10	33.3	16	39	7.134	21.42%	-9.18%		30.12	1.25%
100		10	32	23	35	3.399	10.62%	-4.92%		30.12	1.25%
Reproduction	n Detail										
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
)	D	24	29	32	35	26	32	30	32	34	31
6.25		18	33	30	21	31	16	33	30	31	34
12.5		32	30	11	39	13	37	40	30	22	36
25		26	21	21	38	31	33	30	37	37	12
50		28	38	34	16	39	36	35	30	38	39
400											

100

35

34

34

32

34

32

31

32

33

23

Report Date:

21 Jan-20 10:04 (p 6 of 6)

Test Code/ID:

20-55 / 19-7981-7232

Ceriodaphnia 7-d Survival and Reproduction Test

**New England Bioassay** 

Analyzed:

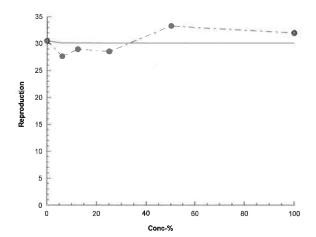
Analysis ID: 16-3497-5334 21 Jan-20 10:03 Endpoint: Reproduction Linear Interpolation (ICPIN) Analysis:

**CETIS Version:** CETISv1.9.4

Status Level:

1

#### **Graphics**



#### NEB'S DATA SHEET FOR ROUTINE CHEMICAL AND PHYSICAL DETERMINATIONS

FACILITY NAME & ADDI	RESS:	Lowell Regional WW Utility, 1st Street Boulevard, Lowell MA 01850									
NEB PROJECT NUMBER			5.0044476.0		TEST ORGA			iodaphnia dubia			
DILUTION WATER SOUR	PD	1	ratory Soft	T	START DAT		1/14/20	TIME: 1145			
ANALYST  NEB Lab Diluent	1	2 2	КО 3	CW 4	KW 5	KW 6	7	Remarks			
Temp °C Initial	25.1	24.8	24.7	24.1	24.9	24.7					
D.O. mg/L Initial	8.5	8.3	8.2	8.5	8.7	8.4					
pH s.u. Initial	7.4	7.5	7.4	7.5	7.3	7.4					
Conductivity µS Initial	176	178	178	178	176	176					
Temp °C Final	24.3	24.0	24.0	24.0	25.6	24.3					
D.O. mg/L Final	8.1	8.4	8.6	8.3	7.9	8.0					
pH s.u. Final	7.9	7.7	7.8	8.0	7.5	7.4					
Conductivity µS Final	205	193	190	199	207	207					
Merrimack River Control	1	2	3	4	5	6	7	Remarks			
Temp °C Initial	25.7	24.9	24.7	24.2	25.0	25.0					
D.O. mg/L Initial	9.7	8.9	8.2	8.8	8.5	8.7					
pH s.u. Initial	7.3	7.5	7.5	7.4	7.4	7.4					
Conductivity µS Initial	166	167	122	123	125	125					
Temp °C Final	24.4	24.0	24.0	24.0	25.6	24.3					
D.O. mg/L Final	8.1	8.1	8.5	8.3	7.9	8.0					
pH s.u. Final	7.9	7.7	7.7	7.9	7.4	7.4					
Conductivity µS Final	184	175	*NR	154	153	152		*NR: not recorded			
6.25%	1	2	3	4	5	6	7	Remarks			
Temp °C Initial	25.6	25.0	25.1	24.1	25.0	24.5					
D.O. mg/L Initial	8.5	8.3	9.0	8.6	9.2	8.8					
pH s.u. Initial	7.5	7.4	7.4	7.4	7.3	7.4					
Conductivity µS Initial	234	239	233	231	268	271					
Temp °C Final	24.4	24.0	24.1	24.0	25.6	24.4					
D.O. mg/L Final	8.2	8.1	8.3	8.2	7.8	8.1					
pH s.u. Final	7.7	7.6	7.6	7.8	7.4	7.4					
Conductivity µS Final	255	247	247	258	302	302					
12.5%	1	2	3	4	5	6	7	Remarks			
Temp °C Initial	25.6	25.0	25.0	24.1	25.4	25.1					
D.O. mg/L Initial	8.4	8.2	8.6	8.5	8.7	8.4					
pH s.u. Initial	7.6	7.5	7.4	7.4	7.3	7.4					
Conductivity µS Initial	309	306	290	289	368	374					
Temp °C Final	24.5	24.0	24.0	24.0	25.5	24.5					
D.O. mg/L Final	8.2	8.2	8.5	8.3	7.9	8.1					
pH s.u. Final	7.7	7.6	7.6	7.7	7.6	7.5					
Conductivity µS Final	330	316	305	304	394	407					

#### **NEB'S DATA SHEET FOR ROUTINE CHEMICAL AND PHYSICAL DETERMINATIONS**

FACILITY NAME & ADDR					eet Bouleva		/A 01850	
NEB PROJECT NUMBER:			5.0044476.0		TEST ORGA			odaphnia dubia
DILUTION WATER SOUR	CE:	Labo	ratory Soft	Water	START DAT	E:	1/14/20	TIME: 1145
25%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.6	25.0	24.9	24.1	25.4	25.1		
D.O. mg/L Initial	8.5	8.2	8.3	8.4	8.6	8.3		
pH s.u. Initial	7.6	7.5	7.4	7.5	7.3	7.5		
Conductivity µS Initial	430	432	419	402	564	560		
Temp °C Final	24.4	24.0	24.0	24.0	25.6	24.5		
D.O. mg/L Final	8.2	8.2	8.4	8.3	7.9	8.1		
pH s.u. Final	7.7	7.7	7.6	7.7	7.7	7.6		
Conductivity µS Final	458	445	437	440	599	619		
50%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.6	24.9	24.8	24.1	25.3	24.8		
D.O. mg/L Initial	8.6	8.3	8.4	8.4	8.7	8.5		
pH s.u. Initial	7.5	7.5	7.4	7.6	7.3	7.4		
Conductivity µS Initial	685	691	606	628	954	945		
Temp °C Final	24.4	24.0	24.0	24.0	25.6	24.5		
D.O. mg/L Final	8.2	8.3	8.3	8.3	7.9	8.1		
pH s.u. Final	7.8	7.8	7.7	7.8	7.8	7.7		
Conductivity µS Final	751	704	634	690	1,097	1,128		
100%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.5	24.9	24.6	24.0	25.1	24.8		
D.O. mg/L Initial	9.1	8.4	8.5	8.5	9.2	8.5		
pH s.u. Initial	7.4	7.5	7.4	7.6	7.2	7.4		
Conductivity µS Initial	1,203	1,216	1,069	1,080	1,727	1,730		
Temp °C Final	24.4	24.0	24.0	24.0	25.6	24.6	Ì	
D.O. mg/L Final	8.2	8.2	8.3	8.3	7.9	8.1		
pH s.u. Final	7.9	8.0	7.9	7.9	8.0	8.0		
Conductivity µS Final	1,244	1,219	1,092	1,148	1,836	1,850		

Tab	Table of Random Permutations of 16							C.dubia Test ID# 20-5					55								
7	12	15	15	1	2	7	16	10	2		14	15	7	13	13	1	0 -	6	1	8	10
13	3	8	16	7	10	11	10	13	5		11	7	13	16	7	7	,	5	13	2	14
3	1	4	5	14	13	3	14	9	13		13	2	9	15	6	2		8	4	5	8
11	8	16	14	15	6	2	6	2	16		8	5	12	3	9	1	3	4	3	10	4
14	9	1	6	3	9	14	13	8	6		5	8	14	7	3	1	5	13	11	4	7
2	16	10	13	5	5	13	2	11	7		3	12	5	14	12	1	6	2	2	9	15
4	6	13	7	2	15	1	9	1	4		7	10	6	9	11	9	)	7	6	16	11
6	14	6	10	4	14	4	15	3	3		4	16	2	6	5	1		12	10	6	9
10	15	2	1	13	12	16	3	4	8		10	1	15	5	14	1	2	14	12	3	2
12	10	7	12	9	11	9	8	12	14		15	4	11	8	16	8	}	9	14	14	1
15	7	5	2	10	7	8	12	6	15		6	13	16	12	15	4		11	8	12	6
16	2	11	8	8	8	15	5	16	1		1	9	8	1	8	14		16	5	13	5
9	13	14	3	6	4	10	11	5	12		9	3	10	4	4	3		10	9	1	3
8	11	9	4	11	3	12	7	7	10		12	14	3	10	1	6		15	16	15	12
1	5	12	11	16	16	5	4	14	9		16	11	1	2	10	5		1	15	7	13
5	4	3	9	12	1	6	1	15	11		2	6	4	11	2	1	1	3	7	11	16
4.4		1.	_	_	12		conc	_	1.0			4.3	_		reps	_		42	2	4.2	2
11	8	16	5	5	13	1	13	2	16		14	12	9	8	7	5		13	3	13	3
2	2	8	8	14	16	4	3	8	11		10	14	15	1	2	1		4	5	15	9
6 14	13 12	2 4	13 16	6 16	5 11	9	15 10	11	10 12		12	6 3	16 12	15	16	9		10	12	16	15
8	6	3	9	4	11 10	14 6	4	5 16	2		3 2	9		14	15	1: 6	-	6	4	1 7	16
9	15	3 12	10	3	2	12	6	10	15		4	13	8 7	16 7	9	1		5 14	15 8	8	8 11
3	10	11	12	13	12	5	11	7	8		9	5	14	11	10	1		3	13	3	5
16	1	13	14	8	14	15	5	3	7		9 11	15	6	12	5	7		11	1	3 14	4
1	14	14	2	9	15	16	14	6	14		7	8	3	13	11	8		7	7	12	7
4	4	6	4	12	3	11	8	15	9		8	1	13	6	3	3		15	9	9	12
15	5	1	11	10	6	3	7	10	5		5	11	10	10	12	1		16	14	5	2
5	3	5	6	7	7	13	2	14	3		16	4	5	5	13	4		9	16	2	6
12	7	15	15	15	9	8	12	12	13		15	10	1	4	6	1		2	6	11	1
10	11	10	3	2	4	2	1	4	6		6	7	11	9	14	10		8	11	4	13
7	9	7	7	11	1	7	16	13	1		13	2	4	2	1	2		12	2	10	14
13	16	9	1	1	8	10	9	9	4		1	16	2	3	8	1		1	10	6	10
1	6	7	4	8	6	5	2	8	15		4	6	6	1	4	5		7	13	2	10
9	15	11	3	11	15	9	10	1	3		8	2	15	7	9	8		16	1	14	3
10	16	4	5	12	9	16	11	7	1		7	16	11	8	3	3		12	2	3	4
4	14	1	9	5	5	4	13	6	8		15	5	12	5	7	10	5	5	11	8	1
7	3	13	14	15	2	1	14	16	5		14	9	2	16	1	13	2	6	14	4	13
16	11	2	1	14	16	6	9	3	4		16	14	3	15	11	1:	1	3	9	12	5
3	10	16	16	13	7	13	1	11	14		9	10	16	2	10	2		10	7	10	16
11	13	9	13	4	13	8	3	5	13	:	10	12	5	12	5	14	4	13	16	5	6
15	2	3	12	9	12	2	4	13	10		3	13	14	4	2	1		14	8	6	12
14	1	14	6	10	1	3	12	4	2		2	4	13	3	16	9		9	3	7	14
13	12	5	11	3	11	15	8	2	7	:	11	7	8	14	6	4		4	4	15	11
12	5	10	7	2	14	7	15	14	16	;	13	1	9	10	12	10	)	11	10	9	8
8	9	8	10	6	4	11	7	10	11		6	8	4	9	8	1	5	8	6	11	9
2	7	6	2	1	8	10	6	15	12		1	11	7	11	13	6		1	15	13	15
6	4	15	8	16	10	14	16	9	6		12	3	10	6	14	7		2	12	16	7
5	8	12	15	7	3	12	5	12	9		5	15	1	13	15	13	3	15	5	1	2
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13	4	10	4	16	13	16	13	5	3		6	14	1	16	8	7		2	3	3	12
5	14	4	6	8	2	15	1	13	14		16	4	15	4	3	13		12	1	4	7
2	2	2	15	14	16	9	12	16	6		10	15	14	9	10	1		14	8	8	16
7	12	15	8	12	3	5	14	7	12		5	13	16	1	7	5		11	2	9	3
6	9	7	14	9	14	10	11	15	11		12	1	12	12	14	10		3	11	11	8
14	5	16	7	10	8	11	8	14	13		7	11	6	3	11	4		4	6	6	9
15	11	8	9	7	12	8	7	1	15		9	3	3	7	13	1:		10	4	5	1
11	6	6	1	4	1	3	16	12	5		4	9	13	13	6	8		15	9	1	14
4	10	3	16	2	11	7	9	6	9		1	8	4	11	5	2		16	10	12	4
1	8	1	13	1	15	4	4	11	4		2	16	5	8	1	9		5	12	16	6
9 12	7 1	14 9	2 10	6 15	4 5	14 2	10	9	8		15 14	10	7	10	9 4	10		6	14	10	11
3	3	9 12	11	15 5	5 9	6	15 6	10	2 10		14 13	2 12	8 9	2 6	2	13 15		8 7	5 15	15 7	5 12
3 10	ა 15	11	5	3 13	7	12	5	3 2	7		13 11	5	10	ь 15	12	3		1	13	13	13 10
8	13	13	3	3	10	13	2	4	1		8	6	11	14	15	6		9	16	2	2
16	16	5	12	11	6	1	3	8	16		3	7	2	5	16	14		13	7	14	2 15
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Cer	iodap	ohnia	dubi	a		Cult	ure Ch	nart			Lot#	Cdz	20 (R	MH	005	A
Brood	mother	source	RMH	309	3-	5 Sou	rce's bro	od size:	18	(Qty.)		L	owel	1	14.20	4
Tech	AH	KF	AN	AU	AH		MC	AH		ARH						
Date	16	1-7	1.8	1-9	1-10		1.18	1-13		1-14					,	
Day acc.	0	1	2	3	4	5	6	7		8	9	10	11	12	13	14
Cup #										DTI						
1_	N	N	N	N	6		15	Y	1	Y 24		<u> </u>				
2	N	N	N	N	6		14	4	2	724						
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13	N	N	N	N	6		16	y	13	4						
							eonates pro net: ≥ 20 n					od mothe			neonates orted egg	
									a brod		A = bro				ortea egg: sting only	9
	✓ or P = neonates present after renewal on previous day (see time in log).  A → = acceptable for acute testing only  T# = neonates used in test, replicate number of test noted (and brood counted).  acc. = if acclimated, H₂O type used w/ renewal this day.															
Test o	Tray diagram used?															
Proje	ct#			Symbols	( ✓ / P)	(Y/N)		Time p	eriod	, neonate	s release	ed		Collec	ction date	/ time
	0044	476	<b>a</b>	Т		У	1-13-2	20/1630	> -	→ 1·1.	3-20/	2120		1.14.	20/1	000
	0460	199		(T)		4		/		→ 1·13	,			1-14	2/12	45
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				Т												
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# SAMPLE RECEIPT CHEMISTRY & CHAIN OF CUSTODY DOCUMENTS

#### **NEW ENGLAND BIOASSAY - INITIAL CHEMISTRY DATA**

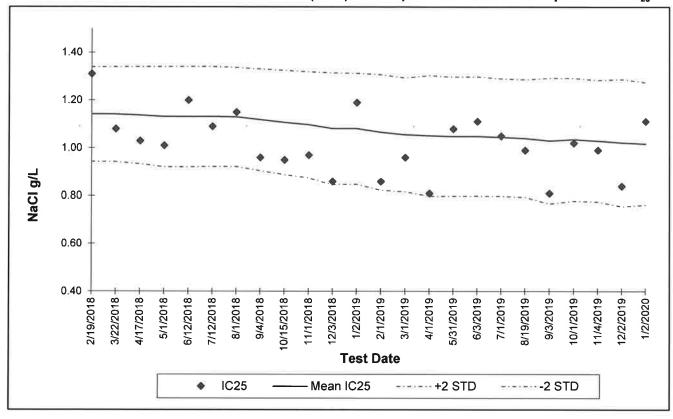
PERMITTEE:	Lowell RWWU	
NEB JOB #	05.0044476.00	

			ř		ř	
DATE RECEIVED	1/13/20		1/15/20		1/17/20	
SAMPLE TYPE:	EFF #1	RIVER #1	EFF #2	RIVER #2	EFF #3	RIVER #3
coc#	C40-1115	C40-1116	C40-1146	C40-1147	C40-1180	C40-1181
pH (SU)	6.8	6.9	7.1	6.9	7.2	7.2
Temperature (°C)	10.6	9.7	8.7	9.2	4.8	7.6
Dissolved Oxygen (mg/L)	11.6	11.9	9.7	9.9	12.4	12.1
Conductivity (µmhos)	1,250	168	1,092	121	1,798	125
Salinity (ppt)	<1	<1	< 1	< 1	<1	<1
TRC - DPD (mg/L)	0.022	0.016	0.013	0.009	0.008	0.014
TRC - Amperometric (mg/L)	N/A	N/A	N/A	N/A	N/A	N/A
Hardness (mg/L as CaCO <sub>3</sub> )	86	22	82	18	82	16
Alkalinity (mg/I as CaCO <sub>3</sub> )	110	15	105	10	105	10
Tech Initials	PD/CH	PD/CH	CW	CW	КО	КО

NOTE: NA = NOT API	PLICABLE		
Data Reviewed By:		Date Reviewed:	1/29/20

### REFERENCE TOXICANT CHARTS

New England Bioassay
Reference Toxicant Data: Sodium chloride (NaCl) Ceriodaphnia dubia Chronic Reproduction IC<sub>25</sub>



								Repro PMSD	Avg. PMSD
Test ID	Date	IC <sub>25</sub>	Mean IC <sub>25</sub>	STD	-2STD	+2STD	Avg. CV	(%)	(%)
18-271	2/19/2018	1,31	1,14	0.10	0.94	1.34	0.09	22,90	16.56
18-416	3/22/2018	1.08	1.14	0.10	0.94	1.34	0.09	17.59	16.88
18-553	4/17/2018	1.03	1.14	0.10	0.93	1.34	0.09	38.54	17.77
18-607	5/1/2018	1.01	1.13	0.10	0.92	1.34	0.09	24.65	18.25
18-816	6/12/2018	1.20	1.13	0.11	0.92	1,34	0.09	46.97	19.59
18-996	7/12/2018	1.09	1.13	0.10	0.92	1.34	0.09	11.41	19,70
18-1103	8/1/2018	1,15	1,13	0.10	0.92	1.34	0.09	17.23	19.67
18-1315	9/4/2018	0.96	1.12	0.11	0.91	1.33	0.10	22.12	20.09
18-1577	10/15/2018	0.95	1.11	0.11	0.89	1.33	0.10	24.32	20.64
18-1625	11/1/2018	0.97	1.10	0.11	0.88	1.32	0,10	31.57	21.34
18-1756	12/3/2018	0.86	1.08	0.12	0.85	1.32	0.11	15.77	21.00
19-8	1/2/2019	1.19	1.08	0.12	0.85	1.31	0.11	40.72	21.30
19-177	2/1/2019	0.86	1.07	0.12	0.82	1.31	0.11	18.71	21.63
19-265	3/1/2019	0.96	1.06	0.12	0.82	1.29	0.11	19.84	22.13
19-403	4/1/2019	0.81	1.05	0.13	0.80	1.30	0.12	10.09	21.85
19-674	5/31/2019	1.08	1.05	0.12	0.80	1.30	0.12	15.59	21.93
19-688	6/3/2019	1:11	1.05	0.12	0.80	1.30	0.12	15.24	22.23
19-926	7/1/2019	1.05	1,04	0.12	0.80	1.29	0.12	12.60	22.23
19-1154	8/19/2019	0.99	1.04	0.12	0.79	1.29	0.12	24.17	22.24
19-1226	9/3/2019	0.81	1.03	0.13	0.77	1.29	0.13	19.49	21.64
19-1396	10/1/2019	1.02	1.04	0.13	0.78	1.29	0.12	18.01	21.38
19-1560	11/4/2019	0.99	1,03	0.13	0.77	1.28	0.12	14.03	21.13
19-1696	12/2/2019	0.84	1,02	0.13	0.76	1.29	0.13	25.84	21.59
20-2	1/2/2020	1.11	1.02	0.13	0.76	1.27	0.13	24.34	22.16

National 75th Percentile and 90th Percentile CV Averages for Ceriodaphnia Reproduction IC25 (EPA 833-R-00-003): 0.45 - 0.62 PMSD Upper and Lower Bounds for Ceriodaphnia Reproduction (EPA-821-R-02-013): 13% - 47%

Work Order: 0A13003 Date: 1/29/2020 1:18:57PM

#### Results:

Sample: Effluent Day 1

0A13003-01 (Water)

#### **General Chemistry**

Limit Analyzed	
<b>Alkalinity as CaCO3 112</b> 2 mg/L 01/17/20	
<b>Ammonia 18.2</b> 0.5 mg/L 01/20/20	
<b>pH 7.2</b> 0.1 SU 01/13/20 16	:45
<b>Specific Conductance 1180</b> 2 uS/cm 01/16/20	
<b>Total Dissolved Solids 492</b> 10 mg/L 01/14/20	
<b>Total Organic Carbon 6.6</b> 0.2 mg/L 01/17/20	
<b>Total solids (TS)</b> 580 10 mg/L 01/14/20	
Total Suspended Solids 6 2 mg/L 01/14/20	

#### **Total Metals**

	Result	Reporting	Units	Date
		Limit		Analyzed
Calcium	28.1	0.05	mg/L	01/16/20
Magnesium	4.60	0.05	mg/L	01/16/20
Aluminum	0.020	0.001	mg/l	01/14/20
Cadmium	ND	0.0001	mg/L	01/14/20
Copper	0.004	0.001	mg/l	01/14/20
Nickel	0.003	0.001	mg/l	01/14/20
Lead	0.0003	0.0001	mg/L	01/14/20
Zinc	0.045	0.001	mg/l	01/14/20
Total Hardness	89.1	0.125	mg/L	01/16/20

Sample: Merrimack River Day 1

0A13003-02 (Water)

#### **General Chemistry**

	Result	Reporting Limit	Units	Date Analyzed
Alkalinity as CaCO3	10	2	mg/L	01/17/20
Ammonia	0.1	0.1	mg/L	01/20/20
pH	6.7	0.1	SU	01/13/20 16:45
Specific Conductance	161	2	uS/cm	01/16/20
Total Dissolved Solids	84	10	mg/L	01/14/20
Total Organic Carbon	3.2	0.2	mg/L	01/17/20
Total solids (TS)	108	10	mg/L	01/14/20
Total Suspended Solids	4	2	mg/L	01/14/20

Work Order: 0A13003 Date: 1/29/2020 1:18:57PM

#### Sample: Merrimack River Day 1 (Continued)

0A13003-02 (Water)

#### **Total Metals**

	Result	Reporting Limit	Units	Date Analyzed
Calcium	6.20	0.05	mg/L	01/16/20
Magnesium	1.19	0.05	mg/L	01/16/20
Aluminum	0.113	0.001	mg/l	01/14/20
Cadmium	ND	0.0001	mg/L	01/14/20
Copper	0.001	0.001	mg/l	01/14/20
Nickel	ND	0.001	mg/l	01/14/20
Lead	0.0005	0.0001	mg/L	01/14/20
Zinc	0.006	0.001	mg/l	01/14/20
Total Hardness	20.4	0.125	mg/L	01/16/20

/ NEW ENGLAND BIOASSAY CHAIN-OF-CUSTODY			
EFFLUENT Sample Set # 1	RECEIVING WATER		
Sampler: JIN BOK MIGOWAN	Sampler: Aaron Fox		
Title: CHEMIST			
Facility: Lowell Regional Wastewater Utilities	Title: Ops styre water Utilities  Facility: Lowell Regional Wastewater Utilities		
Sampling Method: X Composite	Sampling Method: X Grab		
Sample ID:	Sample ID: Merrimack River		
Start Date: /-/2-2020 Time: Time:	Date Collected: /-13 -> 2-3		
End Date: 1-13-2025 Time: 7-0= Ary	Time Collected: $f=000 \text{ Am}$		
Sampling Method: Grab (for pH and TRC only)			
Date Collected:	Received		
Time Collected:	ON ICE		
Sample Type:  X Dechlorinated Unchlorinated Chlorinated			
Receiving Water Sampling Location and Procedures: Plant outfall after de Receiving Water Sampling Location and Procedures: Merrimack (Rt.38)  Requested Analysis: X Chronic and modified acute			
Sample Sh	upment		
Method of Shipment: New England Testing Labs			
Received By:  Date:  Date:  Date:  Date:  Date:  Date:  Date:	1-13-2020 Time: $1/3$ Time:		
FOR NEB U			
* Please return all ice packs NEB has provided to insure acc	curate temperature upon receipt to the NEB laboratory *		
Temperature of Effluent Upon Receipt at Lab: 10.0 °C Te	mperature of Receiving Water Upon Receipt at Lab: 97 °C		
Effluent COC# CUC - 1115 Re	eceiving Water COC#		

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO: KIM WILLS, NEW ENGLAND BIOASSAY, 77 BATSON DRIVE, MANCHESTER CT 06042

, NEW ENGLAND BIOASSAY CHAIN-OF-CUSTODY			
EFFLUENT Sample Set # >	RECEIVING WATER		
Sampler: JIN-BOIC MCGOWAN	Sampler: Aara Fox		
Title: CHEMIST	Title: ofs. Superting		
Facility: Lowell Regional Wastewater Utilities	Title: Superting Facility: Lowell Regional Wastewater Utilities		
Sampling Method: X Composite	Sampling Method: X Grab		
Start Date: / - /4-2020 Time:	Sample ID: Merrimack River		
	Date Collected: /-/5-2020		
End Date: / - /5 - 20 2) Time: 7:00	Date Collected: $1 - 15 - 2020$ Time Collected: $8 - 000 \text{ Arg}$		
Sampling Method: Grab (for pH and TRC only)			
Date Collected:	Received		
Time Collected:	ON ICE		
Sample Type: Prechlorinated			
Sample Type:  X Prechlorinated Dechlorinated			
Unchlorinated			
Chlorinated			
Effluent Sampling Location and Procedures: Plant outfall after de	echlorination. 24 hr. composite.		
	<del></del>		
Receiving Water Sampling Location and Procedures: Merrimack (Rt.38)	River upstream of the plant discharge at the Hunts Fall Bridge,		
Requested Analysis: X Chronic and modified acute			
Sample St	nipment		
Method of Shipment: New England Testing Labs			
1. 12	1 15-10 (252)		
Relinquished By: Date:	7-13-10 Time: / 3 5		
Received By: Date:_	1:15 30 Time: 1330		
Relinquished By: Date:	1/5.30 Time: 1990		
Received By: Date:	1-19-20 Time: 2340		
Relinquished By: Date:	1/-/3/20 Time: 3:25		
Received By: Pur Verne Date:	1/15/20 Time: 1525		
FOR NEB U			
* Please return all ice packs NEB has provided to insure acc	curate temperature upon receipt to the NEB laboratory *		
Temperature of Effluent Upon Receipt at Lab: 8.7 °C Te	mperature of Receiving Water Upon Receipt at Lab: 4.2 °C		
On a mar	eceiving Water COC# <u>C40 - 1147</u>		

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO: KIM WILLS, NEW ENGLAND BIOASSAY, 77 BATSON DRIVE, MANCHESTER CT 06042

NEW ENGLAND BIOASSAY CHAIN-OF-CUSTODY			
EFFLUENT Sample Set #3	RECEIVING WATER		
Sampler: JIM BOK MCGOL	Sampler: Aan For		
Title: LHEMIST	Title: 075 Supu		
Facility:Lowell Regional Wastewater Utilities	Sampler: Agric For  Title: Ops Supu L  Facility: Lowell Regional Wastewater Utilities		
Sampling Method: X Composite	Sampling Method: X Grab		
Sample ID:	Sample ID: Merrimack River		
Sample ID:  Start Date: 1-13-20 Time: 7-00  End Date: 1-17-20 Time: 7-00	Date Collected: $\sqrt{-17-2020}$ Time Collected: $\sqrt{-17-2020}$		
End Date: 1-17-20 Time: 7-03	Time Collected: $\int -\infty A$		
Sampling Method: Grab (for pH and TRC only_	)		
Date Collected:			
Time Collected:			
Sample Type:  X Prechlorinated Dechlorinated Unchlorinated Chlorinated			
Effluent Sampling Location and Procedures: Plant outfal	Il after dechlorination. 24 hr. composite.		
Directic Sumpring Docution and Frocedures. Franciscum	nater decinormation. 21 m. composite.		
Receiving Water Sampling Location and Procedures: Me (Rt.38)	rrimack River upstream of the plant discharge at the Hunts Fall Bridge,		
Requested Analysis: X Chronic and modified acute	Received ON ICE		
Sa	mple Shipment		
Method of Shipment: New England Testing Labs			
Relinquished By:     Byg   Relinquished By:   Byg   Relinquished By:   Relinquished By:	Date: / - /7 -2020 Time: 10-30 A		
Received By:	Date: // 17 / 2020 Time: /070		
Relinquished By:	Date: 1/17/2020 Time: 13/5		
Received By:	Date: 1/17/2020 Time: 1315		
Relinquished By:	Date: 1/17/2020 Time: 14:05		
Received By:	Date: 1/17/20 Time: 1422		
Received By.	Date. Time. Took		
FOR	NEB USE ONLY		
_	sure accurate temperature upon receipt to the NEB laboratory *		
Temperature of Effluent Upon Receipt at Lab: 4-8 °C	Temperature of Receiving Water Upon Receipt at Lab: 7.60 °C		
Effluent COC# C40-1180	Receiving Water COC#		

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO: KIM WILLS, NEW ENGLAND BIOASSAY, 77 BATSON DRIVE, MANCHESTER CT 06042